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TRANSMITTAL OF APPEAL BRIEF (Large Entity)	Docket No. 200-0098

In Re Application Of: **Thomas Anthony Montgomery**

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/543,028	April 4, 2000	E. Garcia Otero	33481	2123	5383

Invention: **METHOD OF DETERMINING A SWITCH SEQUENCE PLAN FOR AN ELECTRICAL SYSTEM**

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **September 16, 2004.**

The fee for filing this Appeal Brief is: **$340.00**

☐ A check in the amount of the fee is enclosed.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

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Signature

Dated: November 16, 2004

Daniel H. Bliss (Reg. No. 32,398) [0693.00217]
Bliss McGlynn, P.C.
2075 West Big Beaver Road, Suite 600
Troy, Michigan 48084
(248) 649-6090

Record I.D. 81049981

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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on

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Daniel H. Bliss

Typed or Printed Name of Person Mailing Correspondence

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit:	2123	)
Examiner:	E. Garcia Otero	)
Applicant(s):	Thomas Anthony Montgomery.	)
Serial No.:	09/543,028	)
Filing Date:	April 4, 2000	)
For:	METHOD OF DETERMINING A SWITCH SEQUENCE PLAN FOR AN ELECTRICAL SYSTEM	)

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

By Notice of Appeal filed September 16, 2004, Applicant has appealed the Final Rejection dated June 16, 2004 and submit this brief in support of that appeal.

REAL PARTY IN INTEREST

The real party in interest is the Assignee, Ford Global Technologies, Inc.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences regarding the present application.

STATUS OF CLAIMS

Claims 1 through 13 have been rejected.

CERTIFICATE OF MAILING: (37 C.F.R. 1.8) I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the U.S. Postal Service with sufficient postage as First Class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on November 16, 2004, by ______________.
Daniel H. Bliss

Claims 1 through 13 are being appealed.

STATUS OF AMENDMENTS

An Amendment Under 37 C.F.R. 1.116 was filed on August 16, 2004 in response to the Final Office Action dated June 16, 2004. An Advisory Action dated September 24, 2004 indicated that the Amendment under 37 C.F.R. 1.116 had been considered, but would not place the application in a condition for allowance. The Advisory Action indicated that, upon the filing of an appeal, the Amendment under 37 C.F.R. 1.116 would not be entered. A Notice of Appeal, along with the requisite fee, was filed on September 16, 2004. The Appeal Brief, along with the requisite fee, is submitted herewith.

SUMMARY OF THE INVENTION

The present invention is a method 20 of determining a switch sequence plan 28 for an electrical system, and in particular an electrical system for the vehicle of this example. The methodology begins in block 100, and all switches contained within a schematic diagram of an electrical circuit are identified. Preferably, a list of the switches organized by function is displayed on the video terminal 24b. Preferably, the schematic diagrams are maintained in the knowledge based engineering library 12. The methodology advances to block 110. (FIG. 2, Page 10, lines 4 through 21).

In block 110, the user 26 defines a new switch group by first selecting individual switches and/or existing switch groups from the list of switches and/or existing switch groups for the electrical circuit. The user 26 specifies whether a switch or switch group within the new switch group should be coincident, that is closed at the same time, or sequential, that is closed

one at a time. The user 26 then organizes the switches and switch groups in a bottom up manner, from lowest level to highest level. The groups of lower level switches and switch groups can be nested within higher level switch groups, until the top level switch group for the switch sequence plan is defined. (FIG. 2, page 10, line 22 through page 11, line 15).

The user 26 also specifies how long the sequential or coincident switch groups within the switch sequence plan should be closed, and the time delay between closings as part of the switch sequence plan using the keyboard or mouse 24c. If the switch group is sequential, the switches will close one at a time and wait a sequential gap time between each switch closing. If the switch group is coincident, they will all close and open at the same time. The methodology advances to block 120. (FIG. 2, page 11, line 18 through page 12, line 8).

In block 120, the methodology organizes the switch groups within the top level switch group in a tree data structure. Advantageously, lower level switch groups are nested within higher level switch groups within the tree structure, to complete the entire tree structure. Preferably, the list of switch groups displayed on the video terminal 24a is updated to include the newly formed switch groups. The methodology advances to diamond 130. (FIG. 2, page 12, lines 9 through 18).

In diamond 130, the methodology determines if all coincident and sequential switch groups have been defined within the top level switch group. If the top level switch group is not defined, the methodology returns to block 110 and continues. Returning to diamond 130, if the top level switch group is defined, the methodology advances to block 140. (FIG. 2, page 12, line 19 through page 13, line 2).

In block 140, the methodology recursively traverses through the switch groups in the data tree structure, and calculates an exact opening and closing time for each switch group as

part of the switch sequence plan 28. The methodology advances to block 150. (FIG. 2, page 13, lines 3 through 7).

In block 150, the methodology generates an executable data file containing simulation commands for setting the position sequences of all switches within the switch sequence plan 28. The switch sequence plan 28 includes the coincident or sequential switch groups comprising the top level switch group, and switch opening and closing times for each switch contained therein. The methodology advances to block 160. (FIG. 2, page 13, lines 14 through 22).

In block 160, the switch sequence plan 28, represented by the executable data file, is available for further analysis, such as by circuit analysis. Advantageously, the switch sequence 28 plan is formatted to provide an input to another computer-aided analysis tool 18, such as the electrical/electronic circuit simulation. (FIG. 2, page 13, line 23 through page 14, line 6).

ISSUES

The issue in this Appeal is statutorily formulated in 35 U.S.C. § 103. Specifically, the issue is whether the claimed invention of claims 1 through 13 is obvious and unpatentable under 35 U.S.C. § 103 over Reed (U.S. Patent No. 4,292,543) in view of Stevenson (Microsoft Project 98 Bible) and Olson (U.S. Patent No. 6,480,815).

GROUPINGS OF CLAIMS

Claims 1 through 6 stand or fall together in regard to the rejection under 35 U.S.C. § 103.

Claims 7 through 10 stand or fall together in regard to the rejection under 35 U.S.C. § 103.

Claim 11 through 13 stand or fall together in regard to the rejection under 35 U.S.C. § 103.

ARGUMENT

35 U.S.C. § 103

As to patentability, 35 U.S.C. § 103 provides that a patent may not be obtained:

> If the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Id.

The United States Supreme Court interpreted the standard for 35 U.S.C. § 103 in Graham v. John Deere, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). In Graham, the Court stated that under 35 U.S.C. § 103:

> The scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined. 148 U.S.P.Q. at 467.

Using the standard set forth in Graham, the scope and content of the prior art relied upon by the Examiner will be determined.

As to the primary reference applied by the Examiner, U.S. Patent No. 4,292,543 to Reed, Sr. discloses electrical energy management devices. A method and apparatus reduces the

cost of electrical utilities services by minimizing peak loading through the staged and controlled initiation of operation of devices which consume significant quantities of electrical energy during start up periods such as motors, compressors, heating systems, air handling units, and large scale lighting without the use of modulation control devices which directly affect the operation of such devices or the rise time of the power input to the devices upon starting. Controller 10 is programmed such that time blocks are provided to prevent the simultaneous actuation of any two load 4A-4B within a selected time interval, for example one minute, to permit a newly initiated load to achieve normal rate of power consumption prior to initiation of a second load.

As to the secondary reference applied by the Examiner, the Microsoft Project 98 Bible to Stevenson et al. discloses adding subtasks to major tasks in your project. After you enter the major tasks in your project, you can begin to flesh out the details by adding subordinate tasks, also referred to simply as subtasks. When you add subtasks, the upper-level task becomes a summary task. Summary tasks and subtasks provide an easy-to-apply outline structure to your schedule. Each task is the same length by default, and each beings on the project start date. Although you can move tasks wherever you like, when you move a summary task, its subtasks move with it. If you want to link a whole range of tasks to be consecutive (one finishes, the next begins, and so on down through the list of tasks), select the first task (predecessor), hold down the mouse button, and drag to select a range of predecessor tasks.

As to the tertiary reference applied by the Examiner, U.S. Patent No. 6,480,815 to Olson et al. discloses path dependent power modeling. FIG. 14 illustrates an overall flow diagram 600 of steps and data files involved in a power estimation process. A library file 610 contains the power modeling structures described above for various different library cells for the integrated circuit design. In the library file 610 are contained the state and path dependent power

structures and any 3-D power tables (as described above) for specific library cells. This file 610 is read by a generate directive file process 615 which generates a directive file 620. The simulator process 625 needs to be informed of which library cells have state and/or path dependent modeling so it can output the necessary information used to perform power estimation for these library cells. The simulator process 625 uses the directive file 620 to obtain this information. The directive file 620 contains a listing of specific signal states and transition paths that the simulator 625 is to watch out for, during simulation, that have an impact on power estimation. These states and transitions are defined within the power modeling structures used in the library file 610 for state and/or path dependent modeling. The directive file 620 is needed in part because the number of possible conditions encountered by the simulator 625 is too great to monitor without information used to direct or focus the simulator's recording activity. During simulation 625, a separate record or tally is made of each occurrence of each condition outlined in the directive file 620 and the totals are aggregated over the simulation interval. Simulation process 625 maintains this record in computer readable memory units of system 112 in a switching activity interchange format (SAIF) file 630 which indicates the number of times each event in the directive file 620 occurred over the time interval of the simulation for each library cell. This information includes input transition times for certain input signals. The power analysis process 635 inputs the SAIF file 630 and applies the recorded conditions to the power models of the library file 610 to obtain power estimates based on any state dependent power modeling, any path dependent power modeling and any 3-D power tables used within the library 610. For each library cell, the relevant counts recorded within the SAIF file 630 are applied to its power model to obtain an estimated power consumption for the library cell. An aggregation of all estimated power consumption amounts is reported in a power report 640. This power report

640 can then be used to determine if the integrated circuit design represented by the power models of the library file 610 meets prescribed power constraints.

Claims 1 through 6

Claim 1 claims the invention as a method (20) of determining a switch sequence plan (28) for an electrical system. The method (20) includes the steps of identifying switches for the electrical system and organizing the identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed. The method (20) also includes the steps of organizing the switch group in a data tree structure for the switch sequence plan (28) and traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan (28). The method (20) further includes the steps of generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan (28) and using the commands within the switch sequence plan (28) to operatively control the switches in a simulation of the electrical system.

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103(a), it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of

review and the Board of Patent Appeals and Interferences is that " [a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) ("In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.")

As to the differences between the prior art and the claims at issue, the primary reference to Reed, Sr. '543 merely discloses electrical energy management devices in which a method and apparatus reduces the cost of electrical utilities services by minimizing peak loading through the staged and controlled initiation of operation of devices which consume significant quantities of electrical energy during start up periods. Reed, Sr. '543 lacks organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan, generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. Contrary to the Examiner's opinion, Reed, Sr. '543 does not implicitly disclose that the common and default relationship is for all switches to be coincident and closed together because the controller 10 is programmed such that time

blocks are provided to prevent the simultaneous actuation of any two loads 4A-4B within a selected time interval. It is well settled that inherency may not be established by probabilities or possibilities, but must instead be "the natural result flowing from the operation as taught." See In re Oelrich, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). While Reed, Sr. '543 discloses in column 1, lines 13 through 15, that it is well known that the simultaneous initiation of operation of two or more such devices rapidly increases the overall electrical power consumption, it still does not disclose organizing identified switches within a switch group by defining a coincident group of switches. Therefore, Reed, Sr. '543 does not organize identified switches within a switch group by defining a coincident group of switches to be closed together.

The secondary reference to Stevenson et al. merely discloses adding subtasks to major tasks in your project in which each task is the same length by default, and each beings on the project start date. Stevenson et al. lacks identifying switches for an electrical system, organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan, generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. In Stevenson et al., a whole range of tasks may be consecutive (one finishes, the next begins, and so on down through the list of tasks), but does not organize identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed

one at a time and by defining a duration of time the switches should be closed. Contrary to the Examiner's opinion, electrical switches are not tasks. Further, while Stevenson et al. discloses that each task beings on the project start date, it does not inherently or explicitly disclose that all the tasks start together (coincident), but rather consecutive (one finishes, the next begins, and so on down through the list of tasks). Therefore, Stevenson et al. does not disclose organizing identified electrical switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time.

The tertiary reference to Olson et al. '815 merely discloses path dependent power modeling in which a separate record or tally is made of each occurrence of each condition outlined in a directive file and the totals are aggregated over the simulation interval and the relevant counts recorded within a SAIF file are applied to its power model to obtain an estimated power consumption for a library cell. Olson et al. '815 lacks identifying switches for an electrical system, organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, and traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan. In Olson et al. '186, the power analysis process 635 inputs the SAIF file 630 and applies the recorded conditions to the power models of the library file 610 to obtain power estimates based on any state dependent power modeling, any path dependent power modeling and any 3-D power tables used within the library 610. Contrary to the Examiner's opinion, there is no position sequence for switches. Further, while Olson et al. '186 uses a simulator for switching activity and a power analysis to obtain power estimates, it does not inherently or explicitly disclose setting a position

sequence of switches. Therefore, Olson et al. '186 does not disclose generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system.

As to the level of ordinary skill in the pertinent art, Reed, Sr. '543 merely discloses minimizing peak loading through the staged and controlled initiation of operation of devices which consume significant quantities of electrical energy during start up periods. Stevenson et al. merely discloses adding subtasks to major tasks in your project in which each task is the same length by default, and each beings on the project start date. Olson et al. '815 merely discloses that a separate record or tally is made of each occurrence of each condition outlined in a directive file and the totals are aggregated over the simulation interval and the relevant counts recorded within a SAIF file are applied to its power model to obtain an estimated power consumption for a library cell. However, there is absolutely no teaching of a level of skill in the electrical switch art of organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure, traversing the data tree structure, generating a simulation command for setting a position sequence of the switches, and using the commands within the switch sequence to operatively control the switches in a simulation. The Examiner may not, because he/she doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. See In re Warner, 379 F. 2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). In fact, Reed, Sr. '543 lacks organizing identified switches within a switch group, defining a duration of time the switches

should be closed, organizing the switch group in a data tree structure for the switch sequence plan and traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan, generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. Stevenson et al. lacks identifying switches for an electrical system, organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan, and generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. Olson et al. '815 lacks identifying switches for an electrical system, organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, and traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan. Further, there is no suggestion or motivation in the art to substitute the tasks of Stevenson and the run simulation and power analysis of Olson et al. '186 into the electrical energy management device of Reed, Sr. '543 because Reed, Sr. '543, Stevenson et al., and Olson et al. '186 operate in an entirely different

manner. The Examiner has adduced no factual basis to support his/her position that it would have been obvious, beginning with Reed's basic circuit and power constraints, to simplify the design by grouping sets of switches into logical units as series or coincident ("parallel") as disclosed by Stevenson.

Even if these references could be combined, neither teaches organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure, traversing the data tree structure, generating a simulation command for setting a position sequence of the switches, and using the commands within the switch sequence to operatively control the switches in a simulation. Applicant is not attacking the references individually, but is clearly pointing out that each reference is deficient and, if combined (although Applicant maintains that they are not combinable), the combination is deficient. The references, if combinable, fail to teach or suggest the combination of a method of determining a switch sequence plan for an electrical system including the steps of identifying switches for the electrical system, organizing the identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan, generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control

the switches in a simulation of the electrical system as claimed by Applicant. Thus, the Examiner has failed to establish a case of prima facie obviousness.

The present invention sets forth a unique and non-obvious combination of a method of determining a switch sequence plan for an electrical system including identifying switches for an electrical system, organizing identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed, organizing the switch group in a data tree structure for the switch sequence plan, and traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan. Advantageously, the method of determining a switch sequence plan for an electrical system hierarchically organizes the switches in nested groups and determines the exact time in the simulation that the switches open or close, so that switches can be added or removed without manually cascading time changes through all of the switches.

Obviousness under § 103(a) is a legal conclusion based on factual evidence (In re Fine, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988)), and the subjective opinion of the Examiner as to what is or is not obvious, without evidence in support thereof, does not suffice. The Examiner may not, because he/she doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. See In re Warner, 379 F. 2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). Because the Examiner has not provided a sufficient factual basis that is supportive of his/her position (see In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967), cert. denied, 389 U.S. 1057 (1968)), the rejection of claim 1 is improper.

Against this background, it is submitted that the present invention of claim 1 is not obvious in view of Reed, Sr. '543, Stevenson et al., and Olson et al. '186. The references fail to teach or suggest the combination of a method of determining a switch sequence plan for an electrical system of claim 1. Therefore, it is respectfully submitted that claim 1 is not obvious and is allowable over the rejection under 35 U.S.C. § 103.

The law is clear that a claim in dependent form shall be construed to incorporate by reference all of the limitations of the claim to which it refers. 35 U.S.C. § 112, ¶ 4. Dependent claims 2 through 6 perfect and further limit independent claim 1. Claim 2 defines that the method includes the step of selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system. Claim 3 defines that the step of organizing the switches within a switch group includes nesting sequential switch groups and coincident switch groups within a top level switch group. Claim 4 defines that the method includes the step of determining a duration of time between switch closings for a sequential switch group. Claim 5 defines that the step of organizing the switch group in a data tree structure includes nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups. Claim 6 defines that the method includes the step of using the switch sequence plan to analyze an electrical load distribution of the electrical system. Based on the above, it is respectfully submitted that claims 2 through 6 are not obvious and are allowable over the rejection under 35 U.S.C. § 103.

Claims 7 through 10

As to independent claim 7, claim 7 claims the present invention as a method (20) of determining a switch sequence plan (28) for an electrical system. The method (20) includes

the steps of identifying switches from a circuit schematic of the electrical system and selecting an individual switch or a group of switches from a list displayed on a video terminal (24b) of a computer system (22). The method (20) also includes the steps of organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time. The method (20) includes the steps of defining a duration of time the switches in the sequential switch group or coincident switch group should be closed and organizing the switch group in a data tree structure for the switch sequence plan (28). The method (20) further includes traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan (28). The method includes the steps of generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence plan (28) and using the commands within the switch sequence plan (28) to operatively control the switches in a simulation of the electrical system.

None of the references cited, either alone or in combination with each other, teach or suggest the claimed invention of claim 7. Specifically, Reed, Sr. '543 <u>merely</u> discloses electrical energy management devices in which a method and apparatus reduces the cost of electrical utilities services by minimizing peak loading through the staged and controlled initiation of operation of devices which consume significant quantities of electrical energy during start up periods. Reed, Sr. '543 lacks selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time

the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. Contrary to the Examiner's opinion, Reed, Sr. '543 does not implicitly disclose that the common and default relationship is for all switches to be coincident and closed together because the controller 10 is programmed such that time blocks are provided to prevent the simultaneous actuation of any two loads 4A-4B within a selected time interval. It is well settled that inherency may not be established by probabilities or possibilities, but must instead be "the natural result flowing from the operation as taught." See In re Oelrich, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). While Reed, Sr. '543 discloses in column 1, lines 13 through 15, that it is well known that the simultaneous initiation of operation of two or more such devices rapidly increases the overall electrical power consumption, it still does not disclose organizing identified switches within a switch group by nesting within each other a coincident group of switches. Therefore, Reed, Sr. '543 does not organize identified switches within a switch group by defining a coincident group of switches to be closed together.

Stevenson et al. merely discloses adding subtasks to major tasks in your project in which each task is the same length by default, and each beings on the project start date. Stevenson et al. lacks identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a group of switches from a list displayed on a video terminal of

a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. In Stevenson et al., a whole range of tasks may be consecutive (one finishes, the next begins, and so on down through the list of tasks), but does not organize identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time. Contrary to the Examiner's opinion, electrical switches are not tasks. Further, while Stevenson et al. discloses that each task beings on the project start date, it does not inherently or explicitly disclose that all the tasks start together (coincident), but rather consecutive (one finishes, the next begins, and so on down through the list of tasks). Therefore, Stevenson et al. does not disclose organizing identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and defining a duration of time the switches in the sequential switch group or coincident switch group should be closed.

Olson et al. '815 merely discloses path dependent power modeling in which a separate record or tally is made of each occurrence of each condition outlined in a directive file

and the totals are aggregated over the simulation interval and the relevant counts recorded within a SAIF file are applied to its power model to obtain an estimated power consumption for a library cell. Olson et al. '815 lacks identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure for the switch sequence plan, and traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan. In Olson et al. '186, the power analysis process 635 inputs the SAIF file 630 and applies the recorded conditions to the power models of the library file 610 to obtain power estimates based on any state dependent power modeling, any path dependent power modeling and any 3-D power tables used within the library 610. Contrary to the Examiner's opinion, there is no position sequence for switches. Further, while Olson et al. '186 uses a simulator for switching activity and a power analysis to obtain power estimates, it does not inherently or explicitly disclose setting a position sequence of the switches. Therefore, Olson et al. '186 does not disclose generating a simulation command for setting a position sequence of switches within a sequential switch group or coincident switch group from the opening and closing times for a switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of an electrical system. As such, there is no motivation in the art to combine Reed, Sr. '543, Stevenson et al., and Olson et al. '186 together.

As to the level of ordinary skill in the pertinent art, there is absolutely no teaching of a level of skill in the electrical switch art of organizing identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure, traversing the data tree structure recursively, generating a simulation command for setting a position sequence of the switches, and using the commands to operatively control the switches in a simulation. The Examiner may not, because he/she doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. See In re Warner, 379 F. 2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). In fact, Reed, Sr. '543 lacks selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. Stevenson et al. lacks identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a

group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system. Olson et al. '815 lacks identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, and organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan. Further, there is no suggestion or motivation in the art to substitute the tasks of Stevenson and the run simulation and power analysis of Olson et al. '186 into the electrical energy management device of Reed, Sr. '543 because Reed, Sr. '543, Stevenson et al., and Olson et al. '186 operate in an entirely different manner. The Examiner has adduced no factual basis to support his/her

position that it would have been obvious, beginning with Reed's basic circuit and power constraints, to simplify the design by grouping sets of switches into logical units as series or coincident ("parallel") as disclosed by Stevenson.

Even if these references could be combined, none of the references teaches organizing identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure, traversing the data tree structure recursively, generating a simulation command for setting a position sequence of the switches, and using the commands to operatively control the switches in a simulation. The references, if combinable, fail to teach or suggest the combination of a method of determining a switch sequence plan for an electrical system including the steps of identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure for the switch sequence plan, traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence

plan, and using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system as claimed by Applicant.

The present invention sets forth a unique and non-obvious combination of a method of determining a switch sequence plan for an electrical system including organizing identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group should be closed, organizing the switch group in a data tree structure, traversing the data tree structure recursively, generating a simulation command for setting a position sequence of the switches, and using the commands to operatively control the switches in a simulation. Advantageously, the method of determining a switch sequence plan for an electrical system hierarchically organizes the switches in nested groups and determines the exact time in the simulation that the switches open or close, so that switches can be added or removed without manually cascading time changes through all of the switches.

Further, the CAFC has held that "[t]he mere fact that prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification". <u>In re Gordon</u>, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). The Examiner has failed to show how the prior art suggested the desirability of modification to achieve Applicant's invention. Thus, the Examiner has failed to establish a case of <u>prima facie</u> obviousness.

Against this background, it is submitted that the present invention of <u>claim 7 is not obvious</u> in view of Reed, Sr. '543, Stevenson et al., and Olson et al. '186. The references fail to teach or suggest the combination of a method of determining a switch sequence plan for an

electrical system of claim 7. Therefore, it is respectfully submitted that claim 7 is not obvious and is allowable over the rejection under 35 U.S.C. § 103.

Dependent claims 8 through 10 perfect and further limit independent claim 7. Claim 8 defines that the method includes the step of determining a duration of time between switch closings for a sequential switch group. Claim 9 defines that the step of organizing the switch group in a data tree structure includes nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups. Claim 10 defines that the method includes the step of using the switch sequence plan to analyze an electrical load distribution of the electrical system. Based on the above, it is respectfully submitted that claims 8 through 10 are not obvious and are allowable over the rejection under 35 U.S.C. § 103.

Claims 11 through 13

As to independent claim 11, claim 11 claims the present invention as a method (20) of determining a switch sequence plan (28) for an electrical system. The method (20) includes the steps of identifying switches from a circuit schematic of the electrical system and selecting an individual switch or a group of switches from a list displayed on a video terminal (24b) of a computer system (22). The method (20) also includes the steps of organizing the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time. The method (20) includes the steps of defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed and organizing the top level switch group in a data tree structure for the switch sequence

plan (28) by nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups. The method (20) further includes the steps of traversing the data tree structure recursively to calculate opening and closing times for the switches within the sequential switch group or coincident switch group within the top level switch group for the switch sequence plan (28). The method (20) includes the steps of generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group within the top level switch group from the opening and closing times for the switch sequence plan (28). The method (20) includes the steps of using the switch commands within the sequence plan (28) to operatively control the switches in a simulation of the electrical system.

As to the differences between the prior art and the claims at issue, the primary reference to Reed, Sr. '543 merely discloses electrical energy management devices in which a method and apparatus reduces the cost of electrical utilities services by minimizing peak loading through the staged and controlled initiation of operation of devices which consume significant quantities of electrical energy during start up periods. Reed, Sr. '543 lacks selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed, organizing the top level switch group in a data tree structure for the switch sequence plan by nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups, traversing the data tree structure recursively to calculate

opening and closing times for the switches within the sequential switch group or coincident switch group within the top level switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group within the top level switch group from the opening and closing times for the switch sequence plan, and using the switch commands within the sequence plan to operatively control the switches in a simulation of the electrical system. Contrary to the Examiner's opinion, Reed, Sr. '543 does not implicitly disclose that the common and default relationship is for all switches to be coincident and closed together because the controller 10 is programmed such that time blocks are provided to prevent the simultaneous actuation of any two loads 4A-4B within a selected time interval. It is well settled that inherency may not be established by probabilities or possibilities, but must instead be "the natural result flowing from the operation as taught." See In re Oelrich, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981). While Reed, Sr. '543 discloses in column 1, lines 13 through 15, that it is well known that the simultaneous initiation of operation of two or more such devices rapidly increases the overall electrical power consumption, it still does not disclose organizing identified switches within a top level switch group by nesting within each other a coincident group of switches. Therefore, Reed, Sr. '543 does not organize the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time.

The secondary reference to Stevenson et al. merely discloses adding subtasks to major tasks in your project in which each task is the same length by default, and each beings on the project start date. Stevenson et al. lacks identifying switches from a circuit schematic of an electrical system, selecting an individual switch or a group of switches from a list displayed on a

video terminal of a computer system, organizing the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed, organizing the top level switch group in a data tree structure for the switch sequence plan by nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups, traversing the data tree structure recursively to calculate opening and closing times for the switches within the sequential switch group or coincident switch group within the top level switch group for the switch sequence plan, generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group within the top level switch group from the opening and closing times for the switch sequence plan, and using the switch commands within the sequence plan to operatively control the switches in a simulation of the electrical system. In Stevenson et al., a whole range of tasks may be consecutive (one finishes, the next begins, and so on down through the list of tasks), but does not organize identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time. Contrary to the Examiner's opinion, switches are not tasks. Further, while Stevenson et al. discloses that each task beings on the project start date, it does not inherently or explicitly disclose that all the tasks start together (coincident), but rather consecutive (one finishes, the next begins, and so on down through the list of tasks). Therefore, Stevenson et al. does not disclose organizing identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and defining a duration of

time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed.

The tertiary reference to Olson et al. '815 merely discloses path dependent power modeling in which a separate record or tally is made of each occurrence of each condition outlined in a directive file and the totals are aggregated over the simulation interval and the relevant counts recorded within a SAIF file are applied to its power model to obtain an estimated power consumption for a library cell. Olson et al. '815 lacks identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed, organizing the top level switch group in a data tree structure for the switch sequence plan by nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups, and traversing the data tree structure recursively to calculate opening and closing times for the switches within the sequential switch group or coincident switch group within the top level switch group for the switch sequence plan. In Olson et al. '186, the power analysis process 635 inputs the SAIF file 630 and applies the recorded conditions to the power models of the library file 610 to obtain power estimates based on any state dependent power modeling, any path dependent power modeling and any 3-D power tables used within the library 610. Contrary to the Examiner's opinion, there is no position sequence for switches. Further, while Olson et al. '186 uses a simulator for switching activity and a power analysis to obtain power estimates, it does not

inherently or explicitly disclose setting a position sequence of the switches. Therefore, Olson et al. '186 does not disclose generating a simulation command for setting a position sequence of switches within a sequential switch group or coincident switch group within a top level switch group from the opening and closing times for a switch sequence plan, and using the switch commands within the sequence plan to operatively control the switches in a simulation of the electrical system. As such, there is no motivation in the art to combine Reed, Sr. '543, Stevenson et al., and Olson et al. '186 together.

As to the level of ordinary skill in the pertinent art, there is absolutely no teaching of a level of skill in the electrical switch art of organizing identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed. The Examiner may not, because he/she doubts that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in the factual basis. See In re Warner, 379 F. 2d 1011, 154 U.S.P.Q. 173 (C.C.P.A. 1967). Further, there is no suggestion or motivation in the art to substitute the tasks of Stevenson and the run simulation and power analysis of Olson et al. '186 into the electrical energy management device of Reed, Sr. '543 because Reed, Sr. '543, Stevenson et al., and Olson et al. '186 operate in an entirely different manner. The Examiner has adduced no factual basis to support his/her position that it would have been obvious, beginning with Reed's basic circuit and power constraints, to simplify the design by grouping sets of switches into logical units as series or coincident ("parallel") as disclosed by Stevenson.

Applicant is not attacking the references individually, but is clearly pointing out that each reference is deficient and, if combined (although Applicant maintains that they are not combinable), the combination is deficient. The present invention sets forth a unique and non-obvious combination of a method of determining a switch sequence plan for an electrical system that hierarchically organizes the switches in nested groups and determines the exact time in the simulation that the switches open or close, so that switches can be added or removed without manually cascading time changes through all of the switches. The references, if combinable, fail to teach or suggest the combination of a method of determining a switch sequence plan for an electrical system including the steps of identifying switches from a circuit schematic of the electrical system, selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system, organizing the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time, defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed, organizing the top level switch group in a data tree structure for the switch sequence plan by nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups, traversing the data tree structure recursively to calculate opening and closing times for the switches within the sequential switch group or coincident switch group within the top level switch group for the switch sequence plan, generating simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group within the top level switch group from the opening and closing times for the switch sequence plan, and using the switch commands within the sequence plan to operatively control the switches in a simulation of the electrical

system as claimed by Applicant. The Examiner has failed to establish a case of prima facie obviousness.

Against this background, it is submitted that the present invention of claim 11 is not obvious in view of Reed, Sr. '543, Stevenson et al., and Olson et al. '186. The references fail to teach or suggest the combination of a method of determining a switch sequence plan for an electrical system of claim 11. Therefore, it is respectfully submitted that claim 11 is not obvious and is allowable over the rejection under 35 U.S.C. § 103.

Dependent claims 12 and 13 perfect and further limit independent claim 11. Claim 12 defines that the method includes the step of determining a duration of time between switch closings for a sequential switch group. Claim 13 defines that the method includes the step of using the switch sequence plan to analyze an electrical load distribution of the electrical system. Based on the above, it is respectfully submitted that claims 12 and 13 are not obvious and are allowable over the rejection under 35 U.S.C. § 103.

In conclusion, it is respectfully submitted that the rejection of claims 1 through 13 is improper and should be reversed.

Respectfully submitted,

By: ______________________
Daniel H. Bliss
Registration No. 32,398

BLISS McGLYNN, P.C.
2075 West Big Beaver Road
Suite 600
Troy, Michigan 48084-3443
(248) 649-6090
Dated: November 16, 2004
Attorney Docket No.: 0693.00217
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APPENDIX

The claims on appeal are as follows:

1. A method of determining a switch sequence plan for an electrical system, said method comprising the steps of:

identifying switches for the electrical system;

organizing the identified switches within a switch group by defining a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time and by defining a duration of time the switches should be closed;

organizing the switch group in a data tree structure for the switch sequence plan;

traversing the data tree structure recursively to calculate opening and closing times for the switches within the switch sequence plan;

generating a simulation command for setting a position sequence of the switches from the opening and closing times for the switch sequence plan; and

using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system.

2. A method as set forth in claim 1 including the step of selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system.

3. A method as set forth in claim 1 wherein said step of organizing the switches within a switch group includes nesting sequential switch groups and coincident switch groups within a top level switch group.

4. A method as set forth in claim 1 including the step of determining a duration of time between switch closings for a sequential switch group.

5. A method as set forth in claim 1 wherein said step of organizing the switch group in a data tree structure includes nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups.

6. A method as set forth in claim 1 including the step of using the switch sequence plan to analyze an electrical load distribution of the electrical system.

7. A method of determining a switch sequence plan for an electrical system, said method comprising the steps of:

identifying switches from a circuit schematic of the electrical system;

selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system;

organizing the identified switches within a switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time;

defining a duration of time the switches in the sequential switch group or coincident switch group should be closed;

organizing the switch group in a data tree structure for the switch sequence plan;

traversing the data tree structure recursively to calculate opening and closing times for the switches in the sequential switch group or coincident switch group for the switch sequence plan;

generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group from the opening and closing times for the switch sequence plan; and

using the commands within the switch sequence plan to operatively control the switches in a simulation of the electrical system.

8. A method as set forth in claim 7 including the step of determining a duration of time between switch closings for a sequential switch group.

9. A method as set forth in claim 7 wherein said step of organizing the switch group in a data tree structure includes nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups.

10. A method as set forth in claim 7 including the step of using the switch sequence plan to analyze an electrical load distribution of the electrical system.

11. A method of determining a switch sequence plan for an electrical system, said method comprising the steps of:

identifying switches from a circuit schematic of the electrical system;

selecting an individual switch or a group of switches from a list displayed on a video terminal of a computer system;

organizing the identified switches within a top level switch group by nesting within each other a coincident group of switches to be closed together or a sequential group of switches to be closed one at a time;

defining a duration of time the switches in the sequential switch group or coincident switch group within the top level switch group should be closed;

organizing the top level switch group in a data tree structure for the switch sequence plan by nesting lower level sequential switch groups or coincident switch groups within higher level sequential switch groups or coincident switch groups;

traversing the data tree structure recursively to calculate opening and closing times for the switches within the sequential switch group or coincident switch group within the top level switch group for the switch sequence plan;

generating a simulation command for setting a position sequence of the switches within the sequential switch group or coincident switch group within the top level switch group from the opening and closing times for the switch sequence plan; and

using the switch commands within the sequence plan to operatively control the switches in a simulation of the electrical system.

12. A method as set forth in claim 11 including the step of determining a duration of time between switch closings for a sequential switch group.

13. A method as set forth in claim 11 including the step of using the switch sequence plan to analyze an electrical load distribution of the electrical system.